

may not be necessary when universal joints are used between the spindle and the bar.

Jigs for Multiple Boring. — As a rule but one hole is bored out at a time, owing to the fact that machines for boring generally have but one spindle. Several holes, however, could be bored out in a large-size multiple-spindle drill, in which case the jigs naturally ought to be designed somewhat stronger. Another method of designing jigs for boring two or more holes

Fig. 7. Jig for Boring Holes
through Work both from Sides
and Ends

at the same time is illustrated in Fig. 6, the* outlines only being shown in this illustration. The gear-box /! contains the main driving gear which is mounted on a shaft *K* which, in turn, is driven by the spindle of the machine. The gear on shaft *B* drives the gears and shafts connected

with the boring bars passing through the bushings (\\ />,, f, /*\\ (;, and //. The gears are proportioned according to the speed required for each bar, which in turn is determined by the sizes of the holes. The housing or gear-box A slides on a dovetail slide A'", A particularly good fit should be provided, and the gear-box can be fed along in relation to the work either by table or spindle feed. If